



U.S. DEPARTMENT OF COMMERCE
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Damage Assessment Center
Florida Keys National Marine Sanctuary

DATE: 08/08/01

TO: Sharon Shutler and Martin Hindel, NOAA General Counsel
Maureen Malvern and Mara Tickett, Florida DEP Office of General Counsel

FROM: Kevin Kirsch and Sean Meehan, NOAA Damage Assessment Center, Florida
Keys National Marine Sanctuary

SUBJECT: *D Man I* vessel grounding assessment report

FMP INCIDENT (CASE) #: 01-3A-11456

FMP CITATION: 011176B

NAME & DESCRIPTION OF VESSEL: *D Man I*, 34' 1986 Sea Ray Model 340EC

VESSEL OPERATOR: John Andrew Green

DATE AND TIME OF INCIDENT: 7/29/01 @ 1800 hrs.

LOCATION OF INJURY: Calda Bank, near Calda Channel marker 3 (state water, Key West, FL)

LAT/LONG POSITION: N 024° 37.6302' W 081° 49.2723' (beginning of inbound)
N 024° 37.6213' W 081° 49.2538' (middle of blowhole)
N 024° 37.6176' W 082° 49.2524' (south berm)

TOTAL AREA IMPACTED:

42.37 m² of seagrass bottom cover excavated
82.58 m² of seagrass bottom cover buried
124.95 m² of seagrass bottom cover impacted

PHOTO/VIDEO DOCUMENTATION:

Digital video

DISCUSSION: On 07/30/01 Kevin Kirsch and Sean Meehan conducted an injury assessment of the grounding site of the 34' Sea Ray power vessel *D Man I* (see Figures 1-2). This grounding occurred on Calda Bank near the Calda Channel marker # 3 (See NOAA Chart # 11445). GPS Lat/Long coordinates were taken at several points within the injury.

METHODOLOGIES

Utilizing differentially corrected, surveying-grade DGPS equipment (Trimble® Pro XR with a TSC1 Datalogger), the grounding site was mapped by physically tracing the outlines of the various injury features. The coordinates generated by the tracing work were downloaded to GPS Pathfinder® Office data processing software version 2.70 (Trimble) and then to Arcview® GIS version 3.2a (ESRI), which is used to arrive at square meter area calculations for the injury features. Depth measurements were made by passing an inflatable 8' boat back and forth over the injury equipped with a Garmin® 185 Depth Sounder integrated with a Trimble® Pro XR DGPS mounted on the stern. Depth readings taken by the Garmin are incorporated with differentially corrected positions taken by the Trimble. This information is then processed using Arcview® GIS version 3.2a with the 3D Analyst Extension resulting in a 3 dimensional view of the area. Measurements were made using the water surface as the level plane.

Community composition, percent cover and density of the benthic community, both in the injured area and in the surrounding undisturbed area, were assessed using a modified Braun-Blanquet technique (Kenworthy and Schwarzhild, 1997; Braun-Blanquet, 1932). This method involves placement of a 0.25m² quadrat on the substrate and visually inspecting the content of the quadrat. The submerged aquatic vegetation (seagrass and macroalgae) and/or coral are identified and assigned a cover-abundance scale value. The scale values are: 0.0 = not present, 0.1=solitary specimen, 0.5=few with small cover, 1=numerous but less than 5% cover, 2=5-25% cover, 3=25-50% cover, 4=50-75% cover, and 5=75-100% cover. In order to determine the percent cover per individual species, as well as the total seagrass cover, the Braun-Blanquet scores by species and total cover are averaged over all of the quadrats assessed within each feature (injured area, undisturbed area). The point estimates of percentage cover corresponding to these average Braun-Blanquet scores are then calculated using the attached conversion table (see Appendix A). The loss of percent cover of seagrass as a result of the grounding can then be assessed by comparing the percent cover of the injured area to that of the undisturbed area immediately adjacent to the injury.

DESCRIPTION OF INJURY

This grounding occurred on a shallow seagrass bed characterized as a *Thalassia testudinum* dominated seagrass community. Other living components include sponges and other invertebrates typical of seagrass meadows in this area of the FKNMS, various species of macroalgae, and numerous species of fishes. The sediments consist of cohesive carbonate sands and muds, shell fragments and *Halimeda* algae fragments.

The injury consisted of a blowhole, three berms and an inbound track (see Figure 3). The blowhole had a planimetric area of 27.00 m² with a maximum depth of 0.7 meters below the surrounding seafloor (see Figure 4). The volume of material removed is calculated to be 7.60 m³ with a baseline of 0.1 meter below water level. The material excavated from the

blowhole created three berms (see Figure 5).

The northwest berm, between the blowhole and the inbound track, covered an area of 20.36 m² of seagrass bottom cover. The northeast berm and the south berm covered area of 27.94 m² and 34.28 m² respectively.

At low tide portions of both the northeast and south berms were exposed (see Figure 6). The inbound track, proceeding at a bearing of 118° toward the blowhole, consisted of two propscars and a keel scar (see Table 1). The total area of seagrass bottom cover damaged as a result of the inbound track is 15.37 m².

Table 1. Inbound track dimensions

Scar	Length (meters)	Width (meters)	Area (meters ²)
Port	25.79	0.20	5.16
Keel	16.53	0.30	4.96
Starboard	26.25	0.20	5.25

The total area impacted is calculated to be 124.95 m² of seagrass bottom cover, predominately *Thalassia testudinum* (Turtle grass).

Using the Braun-Blanquet technique, no species of seagrass were noted within the injury caused by the *D Man I* (see Table 2). In the surrounding undisturbed areas, one species of seagrass was found. This area is predominately *Thalassia testudinum* (Turtle grass) with an average percent cover of 13.75% (see Table 3).

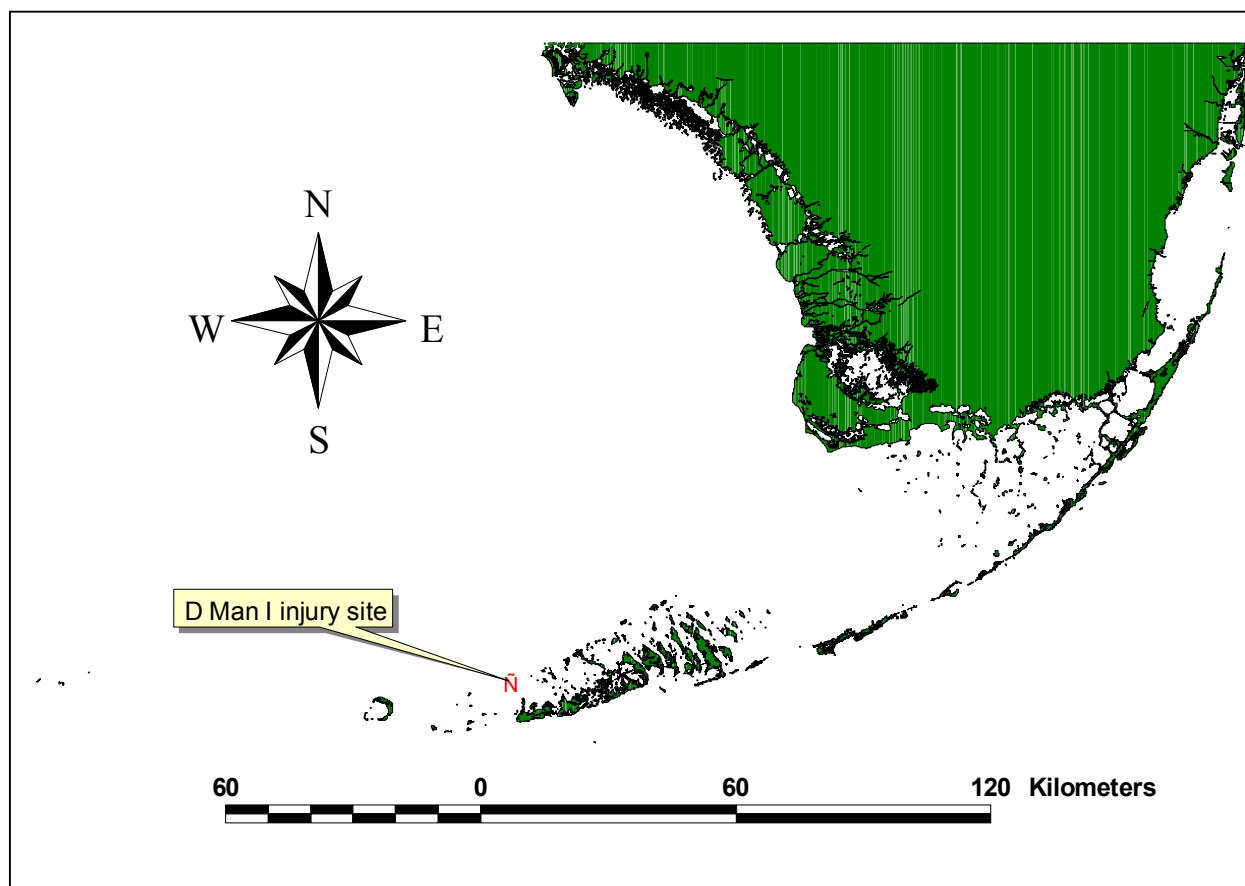


Figure 1. Location of *D Man I* injury site

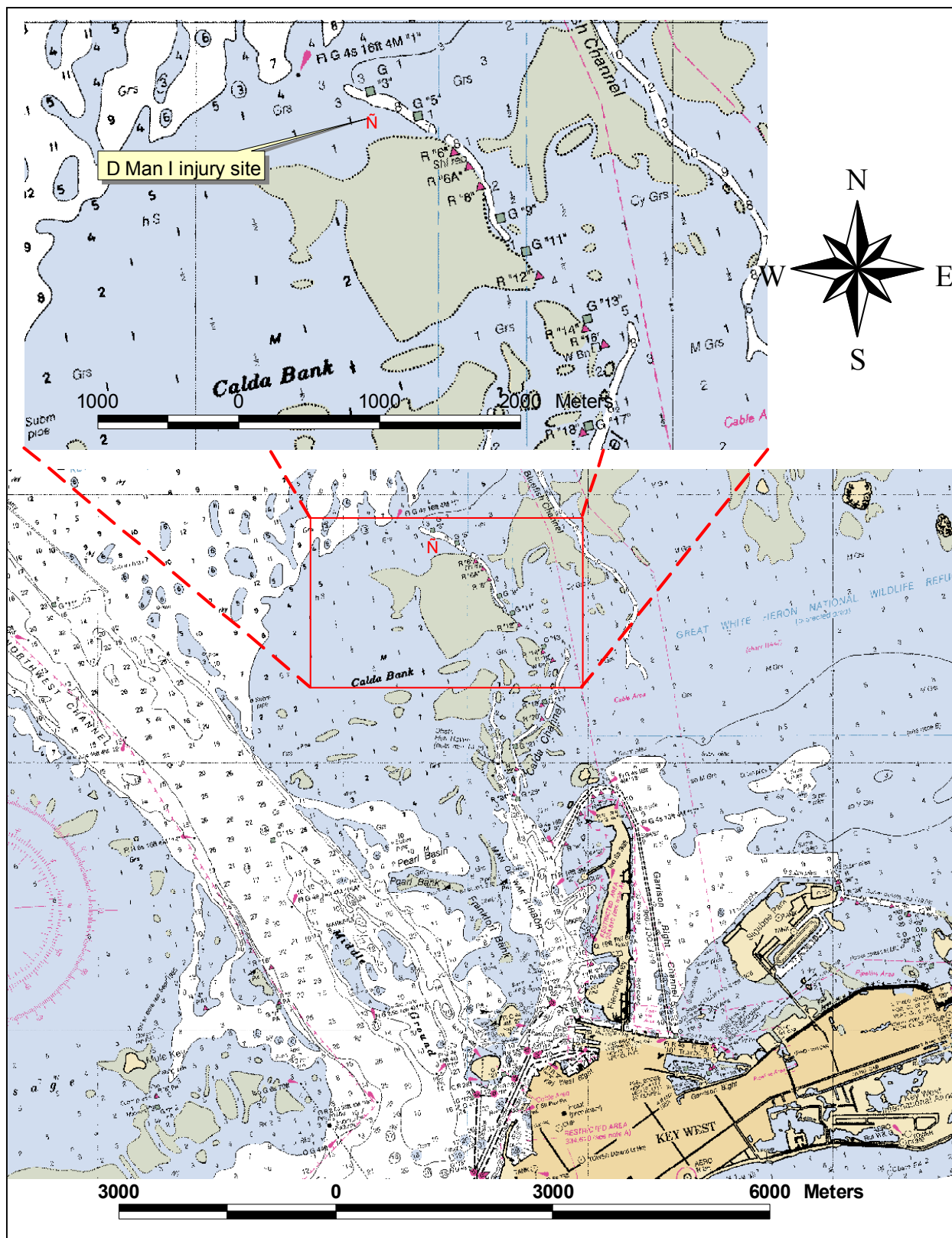


Figure 2. Location of *D Man I* injury site (NOAA Chart #11445).

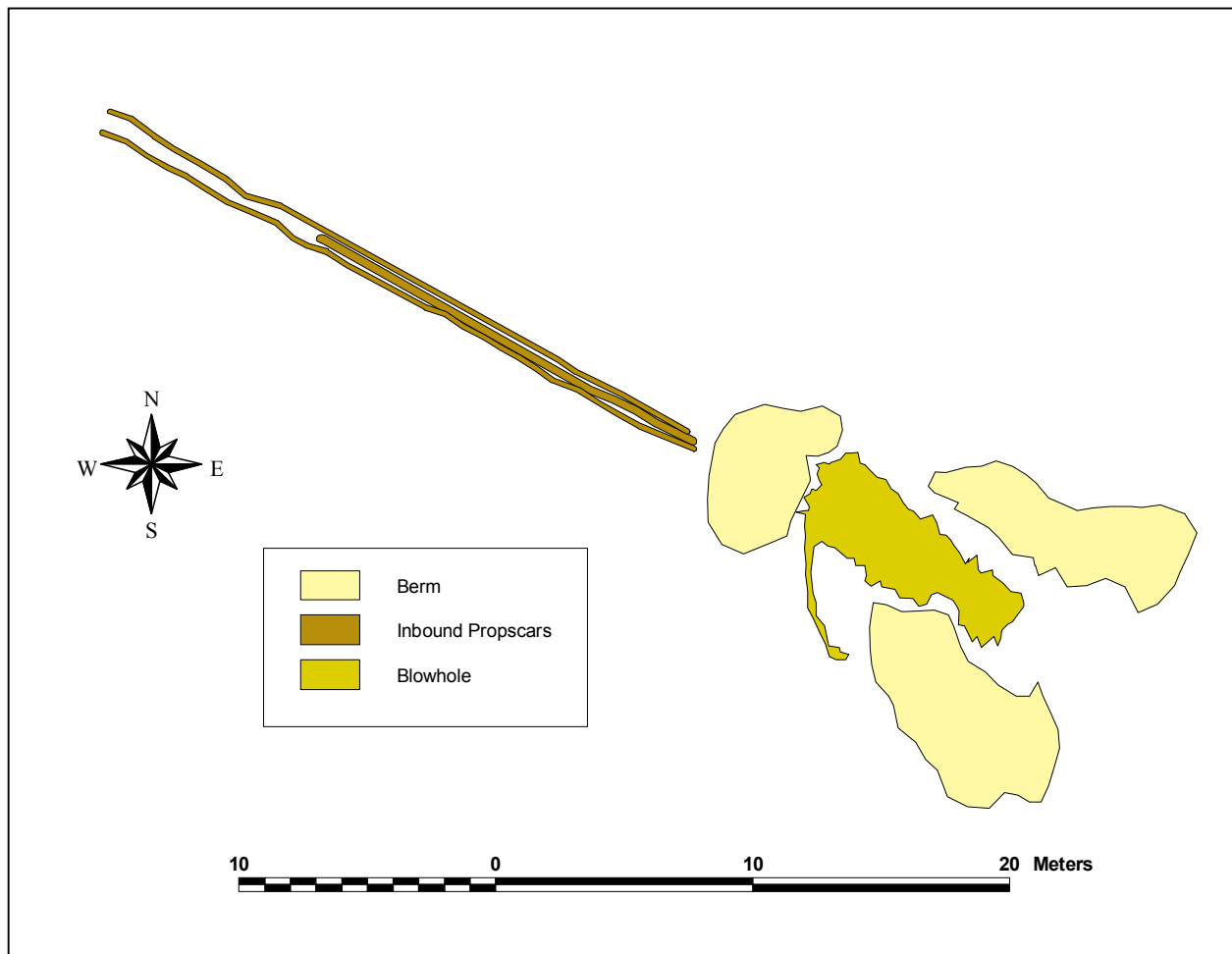


Figure 3. Physical dimensions of *D Man I* injury.

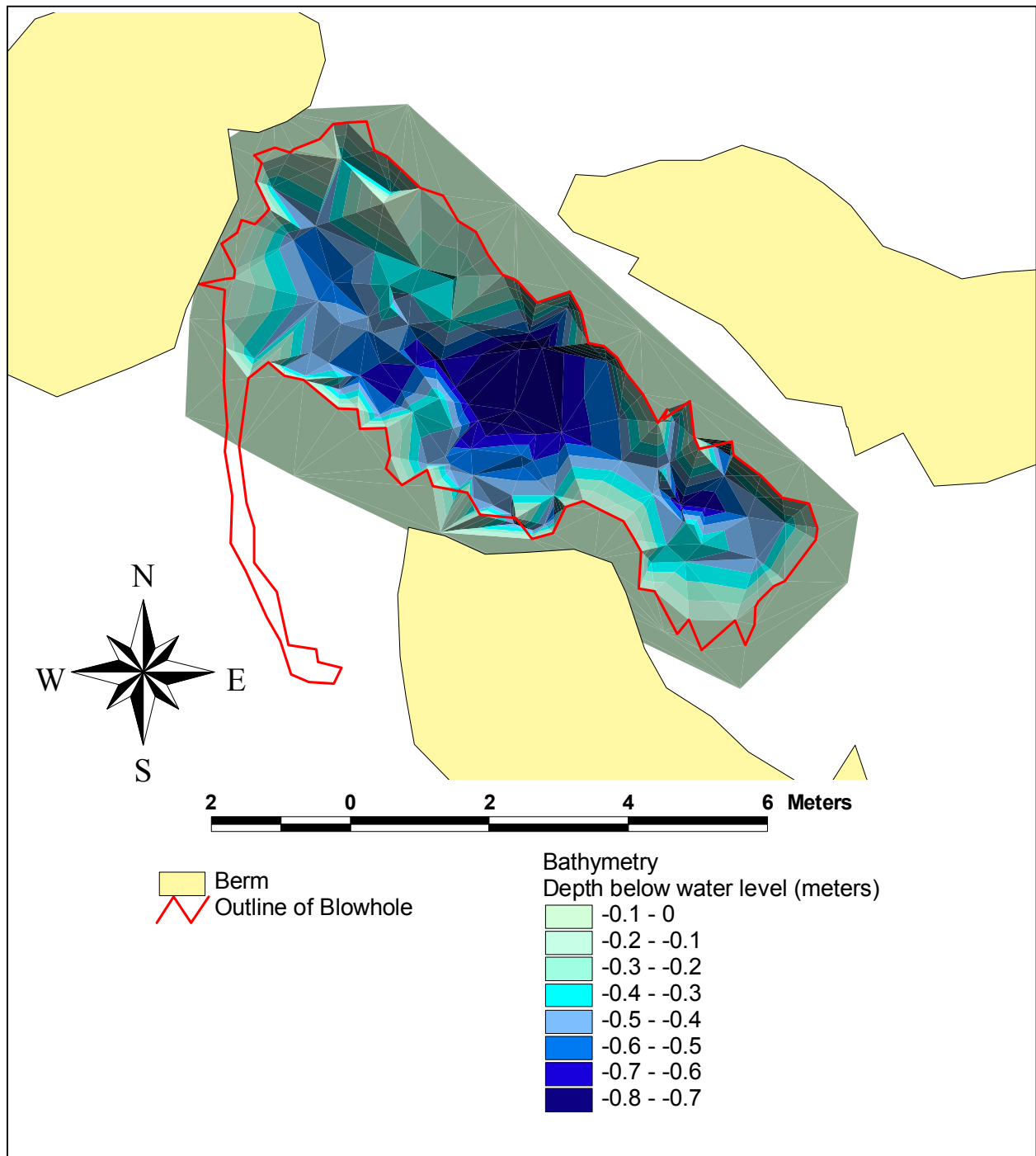


Figure 4. Bathymetry of the *D Man I* blowhole (base depth is -0.1 meters below water level).

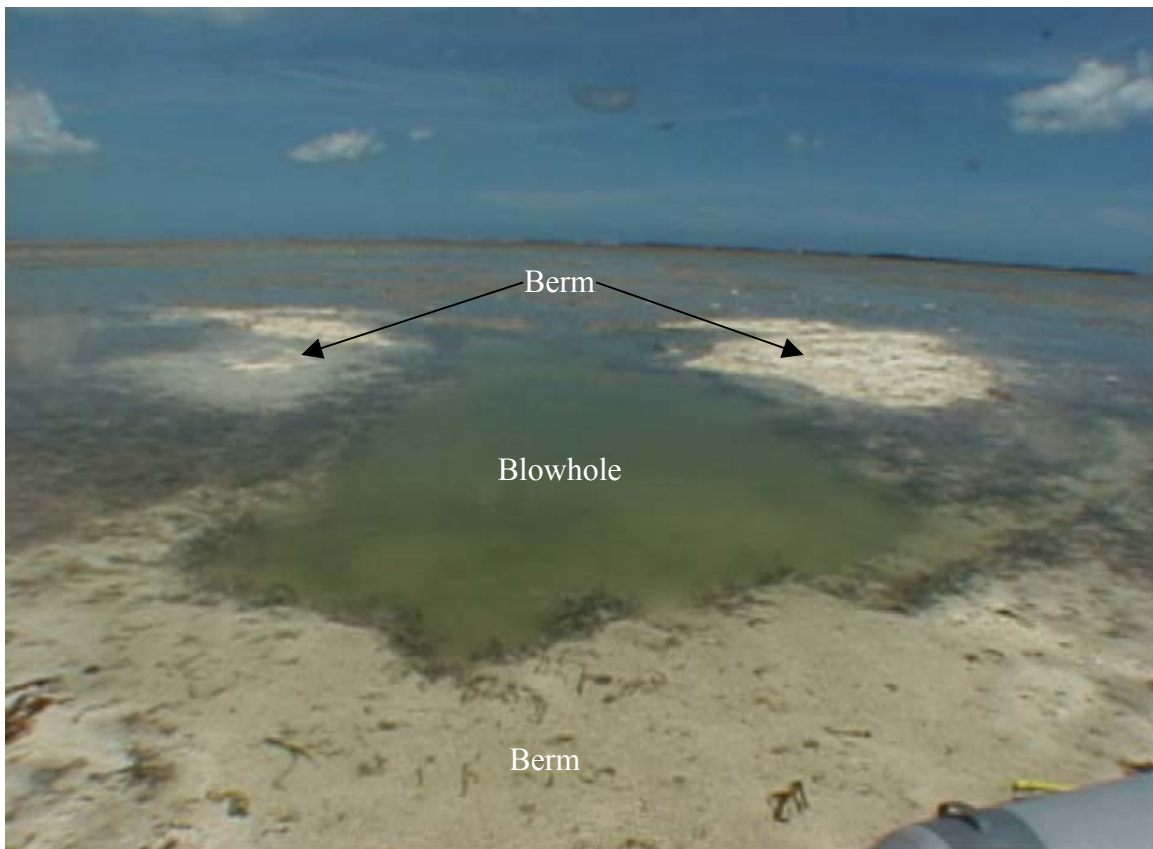


Figure 5. Photo of *D Man I* blowhole and berms. Photo taken from end of the inbound track.



Figure 6. Photo of *D Man I* injury at low tide with berm exposed above water level.

Table 2. Summary of Raw Braun-Blanquet Scores (See Braun- Blanquet scores in Appendix B)

Density ¹	Species	Trench Scar	Berm Scar	Control
	<i>T. testudinum</i>	0	0	1.9
	<i>H. wrightii</i>	0	0	0
	<i>S. filiforme</i>	0	0	0

1) Density = $D_i = \text{SUM} (S_{ij}/n)$

D_i = density of species i

j = quadrat number

S_{ij} = BB score for species i in quadrat j

n = total number of quadrats in transect

Table 3. Braun - Blanquet Scores converted into percent cover. (See Conversion Table in Appendix C)

Percent Cover	Species	Inside Injury	Surrounding Habitat
	<i>T. testudinum</i>	0.00 %	13.75 %
	<i>H. wrightii</i>	0.00 %	0.00 %
	<i>S. filiforme</i>	0.00 %	0.00 %
	Total		13.75 %

REFERENCES

Braun-Blanquet, J. 1932. *Plant Sociology*- the study of plant communities. G.B Fuller and H.S Conrad, Eds. Koeltz Scientific Books. Koenigstein. West Germany.

Kenworthy W.J. and A. Schwarzchild. 1997. Vertical growth and short shoot demography in *Syringodium filiforme* in outer Florida Bay, USA. Marine Ecology Progress Series. vol 173. pp. 25- 37.

Appendix A: *D Man I*: Braun Blanquet Damage Assessment and Habitat Characterization

Percent Cover and Services Lost

Species	Category	Aboveground Percent of Total Per Species in Control Site	Percent Cover in Control Site	Percent Cover Remaining in Trench Scar	Percent of Services Lost in Trench Scar	Percent Cover Remaining in Berm Scar	Percent of Services Lost in Berm Scar
<i>T. testudinum</i>	Density	100.00%	13.75%	0.00%	13.75%	0.00%	13.75%
<i>H. wrightii</i>	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>S. filiforme</i>	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total		100.00%	13.75%				

Average Braun Blanquet Scores

Species	Category	Trench Scar	Berm Scar	Control
<i>T. testudinum</i>	Density	0	0	1.9
<i>H. wrightii</i>	Density	0	0	0
<i>S. filiforme</i>	Density	0	0	0

Prepared by: **NOAA Damage Assessment Center, Marathon, FL**

Appendix B: *D Man I* - Blanquet Scores

Braun Blanquet Damage Assessment

Vessel Name: *D Man I*

Quad #	Injury	<i>T.t.</i>	<i>S.f.</i>	<i>H.w.</i>	Total Grass	TMA	Coral	Sed. Type
1	C	2	0	0	2	0	0	HH/SM
2	C	1	0	0	1	2	0	HH/SM
3	C	1	0	0	1	2	0	HH/SM
4	C	2	0	0	2	1	0	HH/SM
5	C	2	0	0	2	2	0	HH/SM
6	C	2	0	0	3	2	0	HH/SM
7	C	3	0	0	3	2	0	HH/SM
8	C	2	0	0	2	0	0	HH/SM
9	AVERAGE	1.9	0	0	1.9	1.4	0	
10	BH	0	0	0	0	0	0	HH/SM
11	BH	0	0	0	0	0	0	HH/SM
12	BH	0	0	0	0	0	0	HH/SM
13	BH	0	0	0	0	0	0	HH/SM
14	AVERAGE	0	0	0	0	0	0	
15	BM	0	0	0	0	0.1	0	HH/S
16	BM	0	0	0	0	0	0	HH/S/CS
17	BM	0	0	0	0	0	0	HH/MS/CS
18	BM	0	0	0	0	0	0	HH/MS/CS
19	BM	0	0	0	0	0	0	HH/MS/CS
20	BM	0	0	0	0	0	0	HH/MS/CS
21	AVERAGE	0	0	0	0	0	0	

KEY TO ABBREVIATIONS

Species:

T.t. = *Thalassia testudinum*

S.f. = *Syringodium filiforme*

H.w. = *Halodule wrightii*

TMA = Total Macroalgae

Sediment Types:

LC = Live Coral

MS = Muddy Sand

SM = Sandy Mud

R = Rock

M = Mud

CS = Coarse Shell

HH = Halimeda Hash

R = Rubble

Injury Regions:

TR = Trench

BH = Blow Hole

BM = Berm

C = Control (Reference)

Appendix C: Braun-Blanquet Score to Percent Cover Conversion Tables

Interpolation of the Mid-Point of BB Scores			
BB Score	% Cover	BB Score	% Cover
0.00	0.00%	2.60	28.50%
0.10	1.00%	2.70	30.75%
0.20	1.00%	2.80	33.00%
0.30	1.00%	2.90	35.25%
0.40	1.00%	3.00	37.50%
0.50	1.00%	3.10	40.00%
0.60	1.00%	3.20	42.50%
0.70	1.00%	3.30	45.00%
0.80	1.00%	3.40	47.50%
0.90	1.00%	3.50	50.00%
1.00	2.50%	3.60	52.50%
1.10	3.75%	3.70	55.00%
1.20	5.00%	3.80	57.50%
1.30	6.25%	3.90	60.00%
1.40	7.50%	4.00	62.50%
1.50	8.75%	4.10	65.00%
1.60	10.00%	4.20	67.50%
1.70	11.25%	4.30	70.00%
1.80	12.50%	4.40	72.50%
1.90	13.75%	4.50	75.00%
2.00	15.00%	4.60	77.50%
2.10	17.25%	4.70	80.00%
2.20	19.50%	4.80	82.50%
2.30	21.75%	4.90	85.00%
2.40	24.00%	5.00	87.50%
2.50	26.25%		

BB Score	Mid-Point Range
<1= <1%	<1= 1%
1=1%-5%	1=2.5%
2= 5%-25%	2=15%
3= 25%-50%	3=37.5%
4= 50%-75%	4=62.5%
5= 75%-100%	5=87.5%